42nd Congress of the European Regional Science Association

Dortmund, August 27th – 31st , 2002

REGIONAL GROWTH CENTERS – THE MOST ATTRACTIVE LOCATION IN FINLAND?

Sari Pekkala

University of Jyväskylä, School of Business and Economics

P.O. Box 35, FIN-40351 Jyväskylä, Finland

E-mail: pesaan@tase.jyu.fi

Abstract

The present study analyses migration patterns in Finland to test if microeconomic evidence for the Harris-Todaro model can be found. The Harris-Todaro hypothesis states that rural-urban migration stems from regional differences in the wage level and the chances of finding work. To test the hypothesis one needs to predict urban and rural wage and employment probability for each individual. This method is applied to a study of the recent migratory trend in Finland in which most migrants are heading towards a few urban growth centers. Human capital flows to those central regions, while the rest of Finland is losing its population. The present study finds evidence for the Harris-Todaro model and concludes that rural urban migration is a result of higher wages and better employment prospects in urban areas. Hence, the concentric pattern of migration in Finland is expected to continue.

KEYWORDS: *Migration, growth center, Harris-Todaro model, human capital, wages, employment*

JEL-classification: O15, O18, R11, R23

1. Introduction

Most developed countries have experienced increasing regional concentration of population and economic activity throughout the latter half of the 20^{th} century. This, among other issues, has sparked an interest in the regional aspects of the economy. Moreover, the recent theoretical discussion on the agglomeration forces leading to the concentration of economic activities has given a new meaning to many observed patterns such as the European growth triangle, Silicon Valley etc. Also in Finland population has been moving towards a few urban growth centers ever since the industrial revolution began after World War II. Interestingly, the speed of this movement has increased markedly in the last ten years, and highest ever migration figures were reached in 2001.

The major phase of urbanization began in Finland in the 1970s. The new feature, however, is that people are now leaving even the middle-sized towns and head only to the very largest ones. Indeed, only a handful of regions have received a positive net flow of migrants since the mid 1990s. Consequently, fears have been expressed about widening regional disparities.[i] Strategies for reducing the possible negative effects in regions that experience excessive out-migration have been pondered in tandem by economists and politicians. The fear is that if this development continues, which seems likely, the concentration of the population in only a few regions will lead to a very uneven regional structure.

In the popular agglomeration literature concentration patterns are explained by the core-periphery model. However, already much earlier models predicted that migration tends to concentrate people to a small number of urban growth centers (Lewis, 1954; Todaro, 1959; Harris and Todaro, 1970). The present study analyzes microeconomic data in the light of the Harris-Todaro model. The model itself lends itself well to empirical testing and has therefore stimulated empirical work, mainly using macro-level data. The problem with macro analysis is that relating average wages to migration propensities is an insufficient test for the underlying individual migration decisions, and this may explain the often mixed results. Some empirical work with micro data has been conducted, supporting the H-T model (Da Vanzo,1976; Lucas, 1985). The present study follows that lead concentrating on key assumptions of the model that produce the process of rural-urban migration. Moreover, some additional hypotheses, such as distance-decay, are tested in the Finnish context.

The aim is to study both the long-term aggregate trends (1975-96) and more recent individual level information (1985-96) provided by the population census. The country is divided into a group of *growth centers* (Helsinki, Tampere, Turku, Oulu and Jyväskylä) and the *rest of the country* (78 subregions).

The results indicate, firstly, that since the 1970s migrants have continued to move towards the growth center regions, and that those regions have experienced rapid human capital accumulation. In other words, the level of education has grown much more rapidly and the share of highly educated inhabitants has continuously been much higher in the growth centers than in "rural" Finland. The micro-level results reveal that it is indeed the "human capital component" of the labor force that is moving to and, even more clearly, residing in the growth centers. Moreover, the results support the H-T hypothesis that migration to urban areas is caused by better earnings and employment chances those regions offer.

The rest of the paper is organized as follows. Next section presents the standard H-T model, concentrating on the determinants of migration. The subsequent section (section 3) describes the data and empirical methods. Section 4 presents the results concerning individual migratory behavior, and analyzes regional development on the basis of both micro- and macro level observations. The last section concludes.

2. The model of rural-urban migration

Let us first discuss the choice of the migration model. Long-run regional evolution in Finland is very much characterized by migration away from agricultural regions, due to the on-going structural change. Hence a model of rural-urban migration appears to be the natural choice. Krugman's core-periphery model could be another alternative, yet there are certain reasons why it may not be applicable. Firstly, the growth centers in Finland are very small compared to the "core-regions" given as typical examples of agglomeration (less than 300,000 on average, compared to 50-100 million inhabitants in the European growth triangle and U.S. manufacturing belt). It would thus leave the number of cores in Finland non-existent or towns with a population less than 100,000 would need to be "core-regions". Secondly, constructing a strong link between theory and empirical work at individual level using the core-periphery is complicated, and telling apart whether the findings lend support to "rural-urban" or "periphery-core" migration pattern is virtually impossible. Finally, Harris-Todaro (H-T) framework allows unemployment in the destination (growth center) region, without making the migration choice appear irrational. Hence, the H-T model, directly applicable to our empirical case, was chosen.

2.1 The basic Harris-Todaro model

The model is based on individual decision making responding to differential economic opportunities between regions. The simplest model contains only two (sets of) regions, R (rural) and U (urban), and two perfectly competitive production sectors: agriculture and manufacturing. There are two types of mobile labor: agricultural and manufacturing workers. Other factors of production (capital, land and technology) are fixed. Agriculture takes place only in the rural areas, experiencing constant returns. Manufacturing is the urban sector. The economy is closed, but internal trade exists. (Todaro, 1969; Harris and Todaro, 1970)

The industrial production functions are given by (Harris and Todaro, 1970):

(1) $X_A = q(N_A, L, K_A)$

(2) $X_M = f(N_M, K_M)$,

where X_A and X_M are the outputs of agricultural and manufacturing good, N_A and N_M (K_A and K_M) are their respective uses of labor (capital) and L is rural land used by agriculture. Prices of goods are determined by the relative outputs of the goods, and the price of agricultural good, P, can be expressed in terms of the manufactured good:

(3) $P = p(X_M/X_A)$

Wages in the sectors are two of the key variables in the model. They are determined by the marginal productivity of labor. Agricultural real wage is:

(3) $W_A = P \times q'$,

where marginal product of agricultural labor (q') is expressed in terms of manufactures. Real wage in manufacturing is:

(4) $W_M = f' \geq \overline{W}_M$.

Again, marginal product of labor determines the real wage, but it has to equal or exceed the set level of minimum wage, $\overline{W}_M$. The third key variable is the probability of having a job in the urban sector at time t, p(t) (Todaro, 1969). At any time there will be a pool of labor of which a random choice of entry to wage work is made. The probability of being chosen at any time t, $\pi(t)$, depends on the size of the unemployment pool. Hence, Todaro (1969) shows that the probability of having a job at time t can be written as:

(5) $$p(t) = p(t-1) + [1-p(t-1)]\pi(t).$$

Note the difference between the two concepts: getting a new job $\pi(t)$ and having a job p(t). If the probability of having an urban job is very small, then even a large difference in the wage rates will not be enough to cause migration away from rural areas.

2.2 Migration in the Harris-Todaro model

In the standard model, migration between R and U is governed by real wage differences. Workers choose an optimal migration time path in their attempt to maximize their lifetime utility. Workers therefore form expectations about the expected real wages and the likelihood of receiving an urban job. Expected urban real wage in (Harris and Todaro, 1970):

(6) $$EW_U = \overline{W}_M N_M / N_U,$$

where N_U is the total urban labor force and N_M is the urban labor actually employed. The total size of labor force in the whole economy is hence

(7) $$N_A + N_U = \overline{N}_R + \overline{N}_U = \overline{N},$$

where $\overline{N}_R$ is the initial rural and $\overline{N}_U$ the initial urban labor force. Labor force migrates as a result of a positive difference between the expected (lifetime stream of) urban and rural wages. The utility function of workers thus contains both the rural and urban real wages (w) and the respective probabilities of having a job (p) (Lucas, 1985):

(8) $$U_i = u(w_i, p_i, z_i, e_i),$$

where z_i is a vector of characteristics of individual i and e_i is a disturbance term. Individual i picks the optimal location by comparing wages and employment probabilities at alternative regions R and U. The choice of location is determined according to:

(9) $$m_{ir} = m(W_i, P_i, z_i, e_i),$$

where W_i and P_i are now vectors of w_i and p_i at alternative locations and r denotes the region.

2.3 Extensions and further hypotheses

As explained above, the basic H-T hypothesis states that migration to urban centers is speeded up by the earnings differential and the differential employment situation. In many studies these are tested by including regional wage and unemployment levels in the migration equation. However, Lucas (1985) points out that this will lead to biased estimates as the deviation between average regional wage and true individual wage is correlated with individual characteristics also included in the migration equation. Hence we follow Lucas' strategy of predicting values for each individual. We use the basic semilogarithmic wage equation

(10) $\log(w) = \alpha_1 + \beta_1 \times S + \beta_2 \times E + \beta_3 \times E^2 + \varepsilon$,

where S is the years of schooling and E is experience. The employment equation is

(11) $\Pr(Emp) = \alpha_2 + \beta_4 \times F + \beta_5 \times S + \beta_6 \times A + \beta_6 \times A^2 + \beta_6 \times FS + u$,

where F denotes a female, A is the age and FS is the individuals' family status. Moreover, we include the predictions as separate variables to allow different weights to be given.

Using the above variables we can test the H-T hypothesis. However, in this study we also wish to test a number of other hypotheses of interest. Firstly, theory states that just like the benefits of moving also the costs of moving will enter the migration equation (Sjaastad, 1962; Mincer, 1978). Moreover, family migration decisions tend to be made according to the family, rather than individual, utility maximization. Hence, we should control for various factors affecting the costs associated with migration, such as the family status and size, distance and the type of dwelling (owned vs. rented). We expect the probability of migration to be greater for those who have no family and/or no children, and who live in rented accommodation. Distance is of interest also by its own right as the "distance decay" hypothesis states that the likelihood of migration between a pair of regions m and n is smaller the greater the distance between m and n (Clark, 1970; Fotheringham, 1981; Schwartz, 1981). Hence, we expect the likelihood of migration to centers to be greater, ceteris paribus, for those living closer. On the other hand, for those living very close commuting may be the preferred option of mobility and this also needs to be controlled for.

It has been argued that one problem with the H-T model is that it fails to take into account the dual nature of migration (Cole and Sanders, 1985). In other words, the model assumes that all migrants head to the high-paying urban manufacturing sector, whereas in reality many, particularly those with less education, start working in the so-called "urban subsistence sector" (services etc.). In fact, jobs offering a higher wage have a strict entry requirement of human capital and not all migrants can enter. In our view, as the control of labor market is very strict and average education level high, the existence of a "grey economy" and/or minimally educated migrants pose less of a problem for the empirical relevancy of the H-T model in the Finnish case than in developing countries. Nevertheless, it is necessary to control for the human capital of the migrants and the extent of non-economic moves, such as tied movers.

3. Statistical methods and description of the data

Migration decisions are made according to expected lifetime utility. In reality, the perceived net benefit (real wage or utility) of the migrant is never directly observed, but is present as a *latent variable* in the migration decision equation. This suggests that we use the *latent regression approach* (also called the index function approach), which is the basis for most binary or multiple choice models in econometrics (Greene, 1993), to analyze the concentric trends in labor mobility.[ii] Assuming the independence of irrelevant alternatives (IIA), the best alternative is to use multinomial logit analysis (MLOGIT) (Greene, 1993), where the dependent variable can take one of three values, i.e. M=0,1 or 2. In other words, the individual can either stay in his original region (M=0), move to a growth center (M=1) or to countryside (M=2). Estimation is conducted in one stage, i.e. assuming that migration and destination choices are made simultaneously. However, if the IIA assumption is violated, we must opt for a nested logit model (NLOGIT). In that case we wind up making the unrealistic assumption that the choice is made in two stages: first the mobility decision is made (move vs. stay) and then the destination decision (rural vs. urban). More discussion will follow in the next section.

The data set used in the present study consists of a one-percent random sample of the Finnish longitudinal census file and comprises the years 1985-96. Finland is divided into 85 subregions (NUTS4) that represent the actual commuting and labor market areas rather well. In the present study, the two subregions of Åland have been excluded, as they cannot be robustly analyzed within the same framework as “mainland“ Finland. The special character of Åland (self-regulation, isolated geographical position, language etc.) could affect the analysis as it is likely that the personal migration determinants in Åland differ from those in the rest of the country. In addition to the longitudinal data, macro level data for the 83 subregions have been used to determine the aggregate net migration patterns over a longer time period, i.e. 1970-95.

Since the 1970s there have been only five central regions that have consistently had a positive net migration rate, i.e. the growth center regions. Those regions were in fact the only ones that experienced positive net in-migration in the last 6 years. Figure 1 shows the net-migration pattern in 1995-98. The growth centers have also displayed faster job growth and a more rapid speed in births of new firms in the post-recession period than the rest of the country. Finally, as a large job market area Helsinki receives a very large flow of commuters from its neighboring regions and it is necessary to control for the typical commuting behavior in those regions.

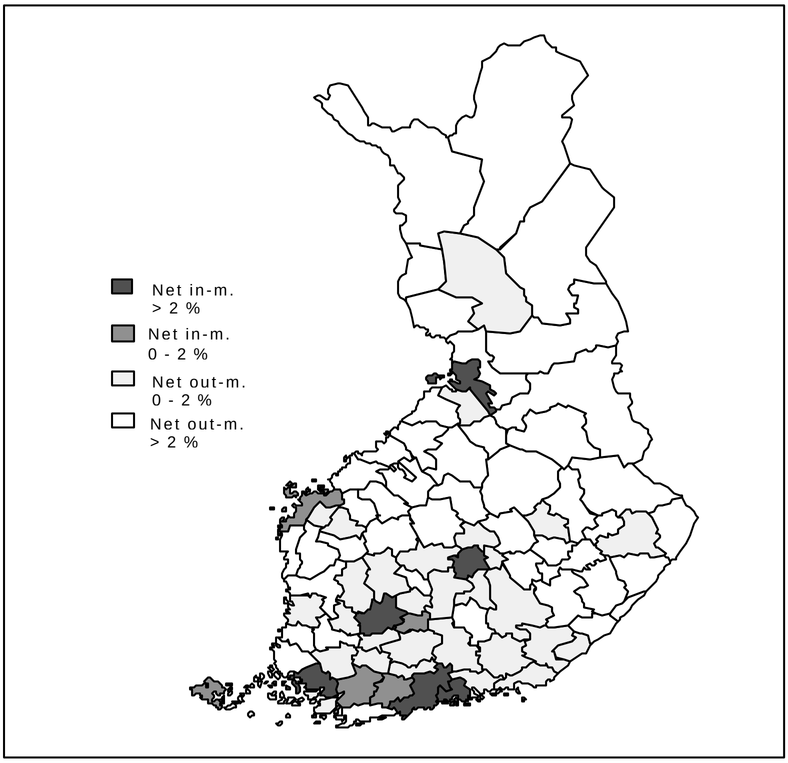

Figure 1: Net in-migration in the Finnish subregions, 1995-1998

The longitudinal population census was combined with employment data and together these provide a vast amount of information about the characteristics of around 36,000 individuals aged 18 to 60. Altogether there are 400,000 individual per year observations during 1985-96. 41 % of these individuals were living in one of the five growth centers (Helsinki, Oulu, Tampere, Turku or Jyväskylä) in 1996, compared to 37 % in 1985. 18 % of all individuals had moved at some point during 1985-96 and 49% had migrated at least once during their lifetime.

4. Migration to growth centers in Finland

This section describes how the regional pattern has evolved since the mid 1970s, and how growth centers differ from rural regions in terms of their income levels, education levels and migration flows. After that the Harris-Todaro- and other hypotheses are tested.

4.1 Aggregate picture

The Finnish economy, as most countries, has displayed a clear trend towards greater concentration of population and economic activity in fewer regions ever since the World War II. The share of urban population[iii] has grown from 32.3 to 65.1 percent between 1950 and 1996, and since the 1960s migration has been directed towards regional growth centers located mainly in southern Finland. The threat of desolation is, in fact, quite substantial in more than 50 out of 85 subregions.[iv] In 1998 only the five "urban growth center regions" received a net inflow of migrants of over 2 percent of their populations, while 74 regions experienced a net loss of migrants. Note, however, that while in the 1960s and 1970s, the growth of urban population was mainly the result of diminishing agricultural sector, the picture was quite different in the 1990s. The agricultural sector was not shrinking nearly as fast as earlier, and even the middle-sized, service and industry oriented towns started losing their population. Only the most technology oriented regions managed to attract migrants, even to the extent that Helsinki was the fastest growing metro region in Europe (EU Report, 1998).

The growth of human capital has also concentrated in the urban centers, even though the level of education has risen in the whole country (table 1). The level of education has traditionally been much higher and has grown faster in the growth centers than in rural areas. The same applies to the share of highly educated inhabitants: twice as many growth center inhabitants have obtained higher education than in other regions. The average share of higher education in Finland has grown during 1975-97, but has consistently been much above the average in the growth centers. Moreover, the growth of higher education has been divergent since the mid 1980s, compared to the previous decade (figure 2). These indicators of regional education support the assumption that human capital tends to accumulate in growth centers.

Table 1: Comparison of centers and the rest of the country

Variable	Urban regions		Rural regions	
	1975	**1997**	**1975**	**1997**
Unemployment rate (%)	4.4	17.0	7.9	21.1
Level of income (FIM)	41 469	73 067	27 644	61 689
Net in-migration (%)	0.005	0.008	-0.006	-0.006
Average age of in-migrants	25.1	27.2	24.5	27.8
Level of education[v], inhabitants	3.98	4.25	3.65	3.80
Share of secondary education, inhabitants (in-migrants)	36.8% (55.3%)	47.2% (58.2%)	36.9% (51.2%)	47.3% (54.6%)
Share of higher education, inhabitants (in-migrants)	12.1% (23.1%)	19.6% (24.4%)	5.2% (15.1%)	10.2% (17.4%)
Agricultural employment (%)	3.8	1.8	29.2	15.4

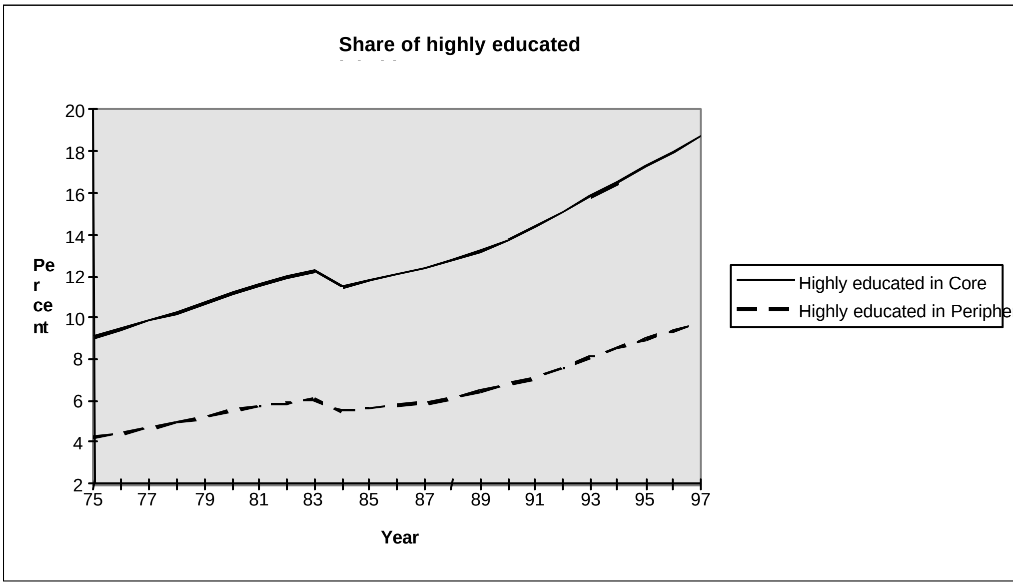

Figure 2: The share of highly educated inhabitants

The five growth center regions have also been richer than the average in terms of their per capita taxable incomes. The income gap has diminished, however, indicating that convergence in per capita incomes can take place simultaneously with a growth in regional disparities as measured by population and economic activity. The continuous flow of migrants has certainly contributed to the population growth of those regions (figure 3), particularly since the mid 1980s. At the aggregate level migration seems to be a concentric force.

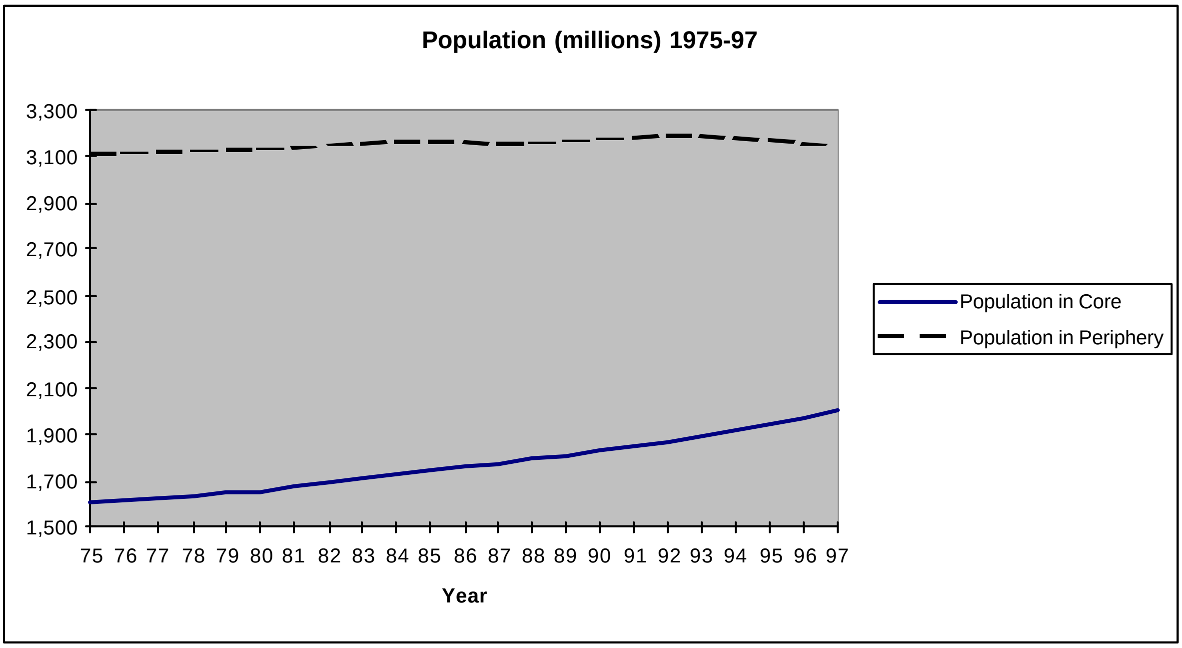

Figure 3: Population in growth centers and other regions

4.2 Tests of the Harris-Todaro and other hypotheses

Looking at the census data it is clear that migration activity varies from year to year. The slowest migration rates are observed during the recession (around 2%) after which they start to increase reaching a level of 3% in 1996. Migration distances show less systematic variation over time. The average distance moved is about 220 kilometers. The individual data also reveal whether human capital is moving from rural areas to centers or whether it is acquired in the urban centers, where universities tend to be established. The data show significant differences across different groups in level of education (table 2). Moreover, the propensity of out-migration to another region type differs widely between education classes in growth centers and other regions. Between 1985-96 the average propensity was 1.2% in the rural areas and 1.3% in the growth centers. However, the respective figures for individuals with higher education were 1.5% and 3.2%. The same is true for in-migration propensity from another region type. In fact, those with basic or no education are the only group where migration balance is positive for rural and negative for urban regions. Migration is clearly widening the gap between rural and urban Finland.

Table 2: Migrant flows by region of origin and education level

	By region of origin		By level of education and region of origin					
	Urban regions	Rural regions	Basic or no education		Secondary education		Higher education	
			Urban	*Rural*	*Urban*	*Rural*	*Urban*	*Rural*
Out-moves 1985-96	2 795	6 801	749	1 709	1 459	3 893	587	1 199
In-moves 1985-96	3 705	5 891	701	1 757	2 167	3 185	837	949
Moves to urban regions	785	2 920	135	1 143	410	1 757	240	597
Moves to rural regions	2 010	3 881	614	566	1 049	2 136	347	602
Number of inhabitants	150 054	249 389	62 626	124 032	63 738	106 635	23 690	18 722
Out-migr propensity (to other region type)	1.3 %	1.2 %	1,0 %	0.9 %	1.7 %	1.7 %	1,5 %	3.2 %
In-migr propensity (from other region type)	2.0 %	0.8 %	0.9 %	1.0 %	2.8 %	1.0 %	2,5 %	1.9 %

To further test our hypotheses concerning migration flows, a multinomial logit model is estimated for individual migration choices during 1985-96. As explained above, the choice between multinomial versus nested logit is a compromise that needs to be made between two more or less unrealistic assumptions. There are two reasons why we opt for the multinomial logit model rather that the nested. Firstly, we argue that the multinomial logit forces less unrealistic structure on the migration model than the nested logit. And secondly, a previous Finnish study showed that the IIA assumption is not violated in the near-identical case to one studied here (Haapanen, 2001). Especially after controlling for the relative wage level and employment probabilities in rural and urban areas, the IIA assumption is more plausible than the stage-wise decision making.

In the first stage rural and urban wages and employment probabilities are predicted for each individual (tables 3 and 4). Wages tend to be higher and employment probabilities greater in urban regions for both males and females. The predictions are used in the migration model (table 5). Other explanatory variables reflect personal and family characteristics. Distance is indicated as the kilometer distance to the closest urban region, and in the case of urban residence distance to the next urban region. First we estimate a single model including all origins. As usual, family size and home ownership tend to keep people from moving, whereas young age and education motivate to move. Interestingly, education only promotes migration to urban areas. As far as other hypotheses are concerned, the distance-decay effect is clear. Distance to the next urban region reduces migration to urban areas but increases migration to rural areas. The size of the effect is rather small, however: an increase of 100 kilometers in the distance reduces migration as much as 2 extra years of age. Compared to the effects other variables, these changes are very small.

Table 3: Employment probabilities and estimates

Observed	**Urban**	**Rural**
Males / females	0.74 / 0.73	0.70 / 0.66
Estimated coefficients		
Intercept	-4.032 (.094)	-4.379 (.078)
Female	0.090 (.020)	-0.035 (.016)
Years of education	0.055 (.005)	0.078 (.005)
Age	0.221 (.005)	0.225 (.004)
Age^2	-0.003 (.001)	-0.003 (.001)
Household head	0.293 (.025)	0.277 (.019)
Married	0.168 (.021)	0.321 (.017)
Time in urban region	0.009 (.011)	-
(Time in urban region)^2	0.001 (.001)	-
Helsinki	0.232 (.017)	-

*Notes: Models include time-dummies. Robust standard errors are reported in parentheses.

Table 4: Determinants of log earnings and estimates

	Urban		**Rural**	
Observed	**Males**	**Females**	**Males**	**Females**
	12.21	11.90	11.84	11.63
Estimated coefficients				
Intercept	10.894 (.045)	11.138 (.039)	10.296 (.047)	10.187 (.041)

Years of education	0.052 (.028)	0.054 (.002)	0.096 (.003)	0.102 (.003)
Experience	0.155 (.002)	0.108 (.002)	0.152 (.002)	0.124 (.002)
Experience^2	-0.002 (.000)	-0.001 (.000)	-0.002 (.000)	-0.002 (.000)
Time in urban region	0.041 (.013)	-0.015 (.011)	-	-
(Time in urban region)^2	-0.004 (.001)	0.002 (.001)	-	-
Helsinki	0.211 (.009)	0.200 (.008)	-	-

*Notes: Models include time-dummies. Robust standard errors are reported in parentheses.

Table 5: Results for multinomial logit models. All origins. 3 choices, base category (coefficients set to 0): staying.

Variable	**Migrating to urban region**		**Migrating to rural region**	
	Coeff.	(p-value)	Coeff.	(p-value)
Constant	-3.474	(.119)	-9.054	(.000)
Female	-1.972	(.000)	3.930	(.000)
Years of education	0.586	(.000)	-0.529	(.000)
Age	-0.094	(.000)	-0.094	(.000)
Household head	-0.904	(.000)	0.909	(.000)
Married	1.673	(.000)	-3.504	(.000)
Owns a dwelling	-1.920	(.000)	-0.626	(.000)
Commuter	0.566	(.000)	1.028	(.000)
Household size	-0.278	(.000)	-0.234	(.000)
Urban origin region	-5.794	(.000)	2.118	(.000)
Distance to nearest urban region	-0.002	(.000)	0.001	(.000)
Urban wage	4.876	(.000)	0.396	(.109)
Rural wage	-5.481	(.000)	1.325	(.000)
Urban employment	39.251	(.000)	-92.556	(.000)
Rural employment	-34.313	(.000)	88.169	(.000)
Log likelihood	-33797.55			
Pseudo R^2	0.260			

*Notes: all models include time indicators.

The H-T variables also show a clear pattern. In the all-origins model urban wages and employment increase mobility to urban regions whereas the rural counterparts reduce it. The coefficients are all significant and very large compared to other effects (4.9 and 39.3 for urban, –5.5 and –34.3 for rural wages and employment, respectively). For mobility to rural areas only employment differences seem to matter and rural wage slightly increases migration towards rural regions. In the origin-specific models (table 6) we should note that the H-T variables only have a true interpretation for the cases "urban to rural" and "rural to urban". In the other cases the staying effect is dominant, as high urban wages and employment encourage to stay in urban areas rather than move to another urban area. Hence the coefficients fail to reach significance. In the "rural to urban"-case urban wage has a positive (3.2) and rural wage a negative (-7.6) effect, and the coefficients of employment are as again large and significant (131.1 for urban and –117.1 for rural). In the "urban to rural"-case urban wages are insignificant, but rural wage has a positive effect. This makes sense as a high urban wage should indeed make the individual more likely to stay and not move to other urban areas. Employment is yet again the crucial influence (-219.8 for urban and 207.3 for rural employment). Hence the results are supportive to the H-T hypothesis: both the rural-urban wage difference and, to the greatest extent, the difference in employment probability matter.

Table 6: Results for multinomial logit models. Models according to home region. 3 choices, base category (coefficients set to 0): staying.

	Urban home region				**Rural home region**			
Variable	**Migrating to other urban region**		**Migrating to rural region**		**Migrating to urban region**		**Migrating to other rural region**	
	Coeff.	(p-value)	Coeff.	(p-value)	Coeff.	(p-value)	Coeff.	(p-value)
Constant	-1.410	(.746)	-9.264	(.003)	24.628	(.000)	-2.301	(.303)
Female	0.248	(.116)	8.301	(.000)	-6.752	(.000)	0.347	(.028)
Years of education	0.018	(.632)	-1.406	(.000)	1.055	(.000)	0.073	(.005)
Age	-0.088	(.000)	-0.114	(.000)	-0.039	(.000)	-0.064	(.000)
Household head	0.009	(.955)	1.462	(.000)	-3.377	(.000)	0.057	(.521)
Married	-0.061	(.753)	-7.935	(.000)	5.321	(.000)	-0.157	(.254)
Owns a dwelling	-1.052	(.000)	0.486	(.000)	-1.987	(.000)	-1.086	(.000)
Commuter	0.899	(.000)	1.319	(.000)	0.581	(.000)	0.849	(.000)
Household size	-0.302	(.000)	-0.143	(.000)	-0.381	(.000)	-0.270	(.000)
Distance to nearest urban region	0.002	(.002)	-0.006	(.000)	-0.003	(.000)	0.001	(.000)
Urban wage	-0.775	(.221)	0.301	(.645)	3.183	(.000)	0.533	(.085)
Rural wage	0.644	(.401)	3.292	(.000)	-7.643	(.000)	-0.482	(.122)
Urban employment	-2.459	(.198)	-219.8	(.000)	131.046	(.000)	-6.944	(.029)
Rural employment	4.515	(.035)	207.3	(.000)	-117.074	(.000)	7.741	(.008)
Log likelihood	-8013.71				-21455.81			
Pseudo R^2	0.422				0.320			

*Notes: all models include time indicators.

To conclude, the results presented above indicate a considerable level of labor mobility. It is also suggested that it is particularly the “human capital component“ of the labor force that migrates to and stays in urban growth centers. Both the aggregate and individual data suggest that there is a trend in Finland of a high-degree regional concentration of population into a few growth centers, one that particularly seems to be emerging in the aftermath of the recession of the 1990s. Like the H-T hypothesis suggests, the causes of that concentration are the better earnings and the employment chances that the highly educated individuals have in urban regions. However, it should be noted that some workers are moving towards “rural“ regions (as defined in the present study), and therefore the speed at which the urban pattern is developing is somewhat retarded, even if the human capital concentration is not.

5. Discussion and conclusions

The present study seeks to test the Harris-Todaro hypotheses directly using micro level data. Other hypotheses, such as distance-decay, were also tested. Finnish population census data were used to analyze the migration decisions of some 36,000 individuals during 1985-96. The regional pattern in Finland has experienced some degree of concentration ever since the 1950s, and this development has speeded up considerably in the 1990s. Moreover, the movement of population towards growth center regions switched from pure rural-urban migration (before mid 1980s) into movement from even middle-sized towns to only few metro regions (1990s). The present study analyzed those trends at the subregional level, and found clear evidence for the accumulation of population and human capital in the five central regions. The micro level results yielded some further evidence for the Harris-Todaro model: earnings and employment possibilities lure people to centers. Hence, human capital is migrating to growth centers and staying there. This indicates greater perceived utility or income for the human capital locating in the regional growth centers, as assumed in the H-T model. Hence, the early migration models are quite consistent with mobility of the degree observed in Finland (Lewis, 1954; Harris and Todaro, 1970).

Even though the pace of rural-urban movement has speeded up recently, there are some decentric forces in operation, too. In other words, some persons are also moving from growth centers to rural Finland, and, to a greater extent, from one rural region to another. These migrants tend, in general, to have lower human capital than those migrating to growth centers. Hence, even though the speed of urbanization on average is reduced by rural migration, the concentration of human capital is not. The most recent figures in Finland show that the speed of concentration may actually be accelerating as the decade ends. These findings are in accordance with international studies (Krugman 1991b, Krugman and Venables, 1995). If this development is considered to be a threat to regional stability an option would be to try and increase the number of growth regions by supporting small-scale regional centers and encouraging the mobility of human capital into smaller towns. Actual migration controls have generally been considered problematic (Harris and Todaro, 1979) and are therefore not usually recommended. On the other hand, regional concentration may actually be *efficient* (i.e. theoretically it is not a horror scenario), and to be competitive in the global economy, Finland needs at least one thriving growth pole. If one accepts this view, the main concern will be to create more urban jobs to reduce the unemployment in growth centers.

References:

Clark W. (1986) *Human Migration*, Beverly Hills, California, Sage.

Cole W. and Sanders R. (1985) Internal migration and urban employment in the third world, *American Economic Review*, 75, 481-494.

Da Vanzo J. (1976) *Why Families Move: a Model of Geographic Mobility of Married Couples*, Santa Monica, The Rand Corporation, R-1972-DOL.

EU Report (1998) Statistics Finland, Helsinki *(in Finnish)*.

Fotheringham A. (1981) Spatial structure and distance decay parameters, *Annals of the Association of American Geographers*, 71, 425-436.

Greene W. (1993) *Econometric Analysis*. Prentice Hall, New Jersey.

Haapanen M. (2000) *Expected Earnings and Interregional Migration*. University of Jyväskylä, School of Business and Economics Working Papers, 221.

Harris J. and Todaro M. (1970) Migration, unemployment and development: a two-sector analysis. *American Economic Review*, 60, 126-142.

Krugman P. (1991a) Increasing returns and economic geography. *Journal of Political Economy*, 99, 483-99.

Krugman P. (1991b) *Geography and Trade*. MIT Press.

Krugman P. and Venables A. (1990) Integration and competitiveness of peripheral industry. In Bliss C. and Braga de Macedo J. (eds.) *Unity with Diversity in the European Community*. Cambridge University Press, Cambridge.

Lewis W. (1954) Economic development with unlimited supplies of labour. *The Manchester School*, 22, 139-91.

Lucas R.E.B. (1985) Migration amongst the Batswana, *Economic Journal*, 95, 358-382.

Mincer J. (1978) Family migration decisions, *Journal of Political Economy*, 86, 749-773.

Schwartz A. (1981) Interpreting the effect of distance on migration, *Journal of Political Economy*, 81, 1153-1169.

Simmons A. (1981) *A Review and Evaluation of Attempts to Constrain Migration to Selected Urban Centres and Regions*, Population Distribution Policies in Development Planning, New York, United Nations Department of Economic and Social Affairs, Population Studies 75.

Sjaastad L. (1962) The costs and returns of human migration, *Journal of Political Economy*, 70, 580-593.

Todaro M. (1969) A model of labor migration and urban unemployment in less developed countries, *American Economic Review*, 59, 138-148.

Todaro M. (1976a) *Migration in Developing Countries: a Review of Theory, Evidence, Methodology and Research Priorities*, Geneva, International Labour Organisation.

Todaro M. (1976b) Urban job expansion, induced migration and rising unemployment: a formulation and simplified empirical test for LDCs, *Journal of Development Economics*, 3, 211-225.

Vanderkamp J. (1974) Migration flows, their determinants and the effects of return migration, *Journal of Political Economy*, 79, 1012-1031.

World Bank (1983) *Growth and Employment in Rural Thailand*, Washington D.C., World Bank, Country Programs Department, East Asian and Pacific Regional Office, Report No. 3906-TH.

Notes:

Acknowledgements: My warmest thanks to Professor Robert Lucas for his suggestions on this paper. This paper is part of a research project funded by Academy of Finland (project no. 52198).

---

[i] In many cases, especially in developing countries, analysts have described rural-urban migration to be excessive (Todaro, 1976a and b; World Bank, 1983; Simmons, 1981). In Finland the problem is considered to be serious due to the extremely low population densities and low birth rates in many parts of the country.

[ii] A latent regression is specified as $y^* = \beta' x + \varepsilon$. However, we only observe $y = 1$, iff $y^*>0$. See Greene (1993) for

further discussion on latent regression models.

[iii] Here urban population refers to population in all urban areas in Finland, not merely the five growth center regions.

[iv] Source: Statistics Finland Population Statistics 1995. Threat of desolation is substantial if the share of square kilometers where youngest inhabitant is over 50 exceeds 16% of all inhabited km²'s. The threat of desolation covers all of northern- and most of eastern Finland. On the west-coast and in the south, where birth rate and in-migration of youth is higher, no threat of depopulation exists (the share of "over 50" km²'s ranges 4-15,9%).

[v] The regional level of education is calculated for each region as

$$X = \sum_{i=1,5}^{8} f_i x_i / \sum_{i=0}^{8} f_i,$$

where fi is the number of individuals and the level of education (xi) ranges from secondary education (i=1,5) to doctoral degree (i=8). The weighed sum of educated persons is then divided by the whole population of the region.